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ABSTRACT

This manual is intended to serve as a step-by-step guide to writing criterion-referenced tests. It includes directions on constructing and scoring various types of test items to measure each level of cognitive function. The manual gives a method for writing, analyzing and rewriting instructional objectives; preparing a content outline; matching test items with objectives; and writing the test items. This guide can be used as a self-paced learning device, as a workshop manual, or as reference material. It provides examples and exercises in both Spanish and English to facilitate skill mastery and reinforce concepts. (Author/AMH)

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How to Write Criterion-Referenced Tests
for Spanish-English Bilingual Programs

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How to Write Criterion-Referenced Tests
for Spanish-English Bilingual Programs

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CONTENTS

PREFACE V

INTRODUCTION 1

UNIT I WHY WRITE INSTRUCTIONAL OBJECTIVES? 5
Unit I Mastery Test 18
Unit I Mastery Test: Answer Guide 23

UNIT II ANALYZING AND REWRITING INSTRUCTIONAL OBJECTIVES 29
Rules for Deciding If an Objective is Suitable for Item Writing 38

UNIT III PREPARING A CONTENT OUTLINE 43
Levels of Cognitive-Learning Outcomes 45
Knowledge 46
Comprehension 47
Application 49
Analysis 50
Synthesis 53
Evaluation 54
Developing a Blueprint 56

UNIT IV MATCHING TEST ITEMS WITH INSTRUCTIONAL OBJECTIVES 63

UNIT V CONTRUCTING DIFFERENT ITEM TYPES 77
Short-Answer Questions 78
Key to Rewriting Test Items 98
Essay Questions 102

UNIT VI RELEVANT QUESTIONS 121

PREFACE

This module is intended to serve as a step by step guide to writing criterion referenced tests. It can be used as a text in a college course, as a module in an inservice training program, a self-paced learning guide or as a professional reference work. Teachers, curriculum writers and students preparing for a career in education will find this work a useful and helpful addition to their professional library.

Each step in criterion referenced test development, from writing objectives to scoring essay tests, is presented in individual units which include multiple examples and exercises to facilitate skill mastery and reinforce each concept. Concepts are presented fully in English and summarized in Spanish. This format facilitates bilingual content mastery. Examples and exercises in both Spanish and English promote acquisition of technical terminology in both languages as well as bilingual application of test development skills.

We wish to thank the teachers and students who participated in the testing of this guide. Their input greatly improved the quality of the final product.

Many individuals on the DACBE staff made significant contributions to this guide. Roberto Leos and Sheila Reifle provided significant assistance in developing the content and form of the publication. Elsa Sánchez de la Vega Lockler and Pam Harper, both on the DACBE editorial staff, and Carmen Barrera, editorial consultant to DACBE, provided substantial assistance in content and copy editing, formating and designing the final publication. Without their assistance, this publication would have been impossible.

We would like to thank Ernest Pérez, Director of Bilingual Education at the Texas Education Agency; Joel Gómez, Director of the National Clearinghouse for Bilingual Education (both of whom are former DACBE directors), for their assistance and support in developing this product. Dr. David Gillmore, Director of Planning, Evaluation and Administrative Services and Dr. Royce King, Director of Program Development provided significant administrative and professional support, with out which this product could not have been completed.

While we acknowledge the important contributions made by all the individuals involved in the project, the views expressed in this work remain the responsibility of the authors.

Carlos E. Pérez, Director
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Center for Bilingual Education

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Introduction

There are two basic questions that can be asked about a child's performance in curriculum areas:

1. What can he do in some skill area in reference to other children his age?
2. What can he do in reference to some domain of skills appropriate for his age or grade?

The first is a norm-referenced question and can best be answered by information taken from standardized tests. The second question, however, is a domain or skill-referenced--sometimes called criterion-referenced--question for which you need a domain-referenced test. Unfortunately, it usually falls to teachers to construct such tests.

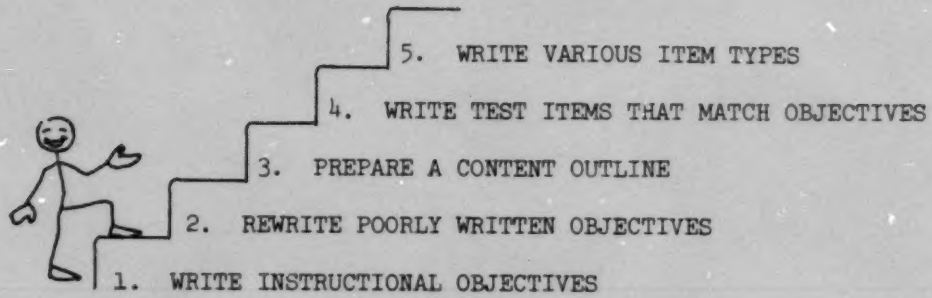
If your interests in children's skills are strictly norm referenced, that's fine--but this guide will be of little use to you. If, on the other hand, your concerns are domain referenced, then this guide will help you to construct domain-referenced tests.

This guide explains the skills required in constructing domain-referenced tests, and guides you in developing them. The specific skills necessary are presented in the following diagram in a sequence of steps, beginning at the bottom, that form a hierarchy, i.e., one step is prerequisite to the other.

Hay dos clases de información que pueden ser obtenidas a través de los resultados de pruebas sobre el contenido de un programa de estudios específicos:

1. Los que el alumno puede hacer, comparado con las habilidades de otros niños de su edad (pruebas basadas en una norma).
2. Los que el alumno puede hacer, tomando como referencia un área de habilidades específicas (pruebas basadas en un área de habilidades).

Para construir pruebas en un área de habilidades, es necesario seguir los siguientes pasos en el orden que se presenten:


5. WRITE VARIOUS ITEM TYPES
4. WRITE TEST ITEMS THAT MATCH OBJECTIVES
3. PREPARE A CONTENT OUTLINE
2. REWRITE POORLY WRITTEN OBJECTIVES
1. WRITE INSTRUCTIONAL OBJECTIVES

Additionally, the following issues are treated:

1. Deciding how many items are needed to test each objective.
2. Deciding what percentage of items must be passed to demonstrate mastery of an objective.
3. Deciding what percentage of objectives must be passed to obtain a certain grade.
4. Interpreting test results in reference to the students' ability to perform in the test area.

Unit I of the guide is designed to teach you how to write instructional objectives.

1. Escriba objetivos instruccionales.
2. Revise objectivos escritos pobremente.
3. Prepare un bosquejo del contenido.
4. Escriba preguntas que cubran los objetivos.
5. Ensamble una prueba basada en un área de habilidades.

Este guía explica uno a uno, estos pasos. Contiene además información referente a:

1. La decisión de cuántas preguntas son necesarias para evaluar al alumno en cada objectivo.
2. La decisión de cuántas preguntas debe contestar el alumno para demostrar que domina el objetivo.
3. La decisión de qué porcentaje de los objetivos se debe dominar para obtener qué calificación.
4. Cómo interpretar los resultados de la pruebas, en referencia a las habilidades del alumno en el área específica.

Some of you may have these skills already. To determine this, take the mastery test at the end of Unit I. If you answer correctly 80% of the items for each objective, you may skip that unit and go on to Unit II.

Unit I. Why Write Instructional Objectives?

Let us start this unit with a rhetorical question: Do you think it's possible to decide how you're going to teach before you know what you're going to teach? Here's another one: Is it possible to determine how successful you are at teaching if you don't know what has been learned? Obviously then, the difficult process of teaching must begin with your knowing what to teach or, even better, what you want the students to learn. Once you've determined these two things, you go about selecting materials and organizing procedures to help the students learn--in other words, you teach. Then, when all this is done, you evaluate the students on what they've learned. So you can see that, at the outset, if you don't determine what you want your students to learn, you can't teach or evaluate.

This is where instructional objectives are useful. They help you specify, in a very precise, observable way, what you hope the students will learn. Thus, the first and foremost criterion of an instructional objective is that:

1. An instructional objective describes learning outcomes.

Learning outcomes are what we direct our teaching to. They specify what we hope the student will acquire at the level of a unit of instruction. Often learning outcomes are confused with learning activities. Activities are what the students do in order to learn or master a skill or concept.

Here are some examples of learning outcomes as opposed to activities for learning.

Antes de enseñar o examinar lo aprendido, es necesario saber qué se va a enseñar o qué se espera que el alumno aprenda.

El resultado del aprendizaje es lo que esperamos que el alumno sepa al terminar una unidad de instrucción. Una actividad de aprendizaje es lo que el alumno hace para obtener el resultado.

Learning Outcomes	Activities
to recognize 50 sight words	to fill out a work sheet
to identify 4 main parts of speech	to play a word game
to transform active voice to passive voice	to listen to an audiotape
to list 5 major parts of the brain	to watch the film How Your Brain Works
to spell 10 sight words correctly	to study spelling
decir los seis colores básicos en inglés	escuchar poemas selectos
contar de diez en diez hasta cien	repasar las tablas de multiplicar
conjugar el verbo ser en el pasado	practicar ejercicios al ritmo de música
identificar tres tipos de raíces	leer la lección acerca del sonido x

As you can see, activities are things the student might do in order to learn: They are the means to achieve the learning outcomes. For example, a student might play a word game to learn the parts of speech. You are teaching him so that he will learn the parts of speech, not so that he can play a word game.

EXERCISE: Distinguish learning outcomes from learning activities. Mark O next to each outcome, A next to each activity.

____1. to practice vocabulary with flash cards
____2. to identify the occupations of people in a picture
____3. to sequence the events in a story
____4. to listen to a story read in Spanish
____5. to practice conversation with a friend
____6. to introduce himself to a friend in English
____7. to recognize the initial sounds of spoken words
____8. to study multiplication tables
____9. to distinguish left from right
___10. to locate countries on a map
___11. recitar de memoria el poema "Las Naranjas"
___12. repetir rimas en inglés
___13. hacer un resumen de los sucesos en el cuento "El patito feo"
___14. señalar los cuatro puntos cardinales
___15. leer para encontrar detalles

1, 4, 5, 8, 12, 15 are activities. The key question to ask yourself is, "For what purpose am I teaching the student?" If you are teaching the student so that he can locate countries on a map, then locate is the learning outcome. To do this you might have him study or look at various maps. Only learning outcomes should be listed in an objective.

So the first criterion of an instructional objective is that it must describe a learning outcome. The second criterion of an instructional objective is that:

2. An instructional objective describes learning outcomes that are observable.

Learning is something you can't see. You can only infer it from what a student does. Thus, in order for us to know if learning has taken place, we must look for the student to do something. Often objectives are written in words that are unobservable; for example:

Observable Outcomes	Unobservable Outcomes
to select	to know
to choose	to understand
to speak	to enjoy
to build	to think
to locate	to familiarize
escribir	disfrutar
recitar	apreciar
identificar	creer
enumerar	confiar

Ask yourself, "Can I see someone know, or think, or understand?" Of course you can't. They would have to do something that tells you they are thinking, or enjoying, or familiarizing. The observable outcomes on the other hand, are...well...observable! You can see them. You can see students do them. You will know if a student can build, or speak, or select because you'll simply see it with your own eyes (or hear it, whichever the case may be). Try your hand at telling observables from unobservables.

EXERCISE: Distinguish observable learning outcomes from unobservable outcomes by checking the unobservables.

____1. to identify the initial sound of words
____2. to familiarize oneself with the passive voice
____3. to add two-digit numbers
____4. to understand the use of the past tense
____5. to enjoy speaking English
____6. to change a verb from present to past tense
____7. to list the characters in the story "Goldilocks"
____8. to really understand multiplication
____9. to appreciate stories read aloud
___10. to recite a short poem from memory
___11. entender el uso de los artículos definidos
___12. enumerar los órganos del aparato digestivo
___13. reconocer animales por su descripción
___14. saber amarrarse los zapatos

2, 4, 5, 8, 9, 11, 13 and 14 are unobservable.

Another thing about unobservables is that they are so vague and general that we can't even think of one specific behavior that would indicate someone knows, or understands, or enjoys. However, consider a word like recognize or discriminate. Neither of those words is observable, yet one can tell easily if someone else is recognizing or discriminating. Shouldn't we call terms like this something else? Yes, we should, and we often refer to them as <u>covert</u> learning outcomes.

Los resultados cubiertos del aprendizaje son aquellos que, aunque no podemos ver, los podemos reconocer fácilmente.

Overt Learning Outcomes	Covert Learning Outcomes
reading	evaluating
writing	analyzing
building	recognizing
speaking	recalling
singing	solving
drawing	synthesizing
sequir instrucciones	clasificar
resolver un problema	distinguir
leer en voz alta	memoriazar
ordenar	inferir

A covert learning outcome is one which can become overt simply by adding an indicator. Before going on to indicators see if you can discriminate between overt and covert outcomes.

EXERCISE: Distinguish overt learning outcomes from covert. Mark C for covert in the space provided.

____1.	to ride	____7.	to differentiate
____2.	to yell	____8.	to circle
____3.	to recall	____9.	recitar
____4.	to discriminate	___10.	pensar
____5.	to separate	___11.	reconocer
____6.	to infer	___12.	evaluar

3, 4, 6, 7, 10, 11, 12 are covert.

Covert outcomes always require some indicator that tells what the student will do to prove he or she is recognizing or solving or inferring or analyzing.

Debe haber un indicador que nos haga saber si el alumno logró el resultado cubierto del aprendizaje.

Covert Outcome	Indicator
to discriminate	by circling
to recognize	by choosing
to solve	by writing
to analyze	by outlining
to evaluate	by selecting
entender	explicando
memorizar	recitando
clasificar	encerrando en un círculo
ordenar	dividiendo en grupos

You must be careful in writing indicators to make them the simplest, most direct way of showing that the covert learning has taken place.

El indicador debe ser lo más simple y directo posible.

The third criteria for an instructional objective is that:

3. An instructional objective describes any special conditions in which the learning will take place.

In other words, if the observable learning is to take place:

At a particular time: "During free choice time"
In a particular place: "When on the playground"; "In a shoe store"
With particular materials, equipment, tools or other resources: "Given a slide rule"; "Given a hammer and nail"

Las condiciones específicas en que se produce el resultado del aprendizaje, deben estar explícitas en los objetivos.

then these conditions must be stated explicitly in the objective.

Below are listed some examples of stated conditions

-Given the name of a classroom object, the child will describe orally where the object is located.
-Given 6 scrambled words, the child will arrange the words to form a sentence.
-On the playground, the child will follow the rules of the game "Ringolevio."
-When read a story, the child will verbally sequence the events.
-Después de escuchar el cuento de los tres osos, el alumno hará un dibujo relacionado con el cuento.
-En el laboratorio de química, el alumno observará las diez reglas de seguridad dadas en clase.
-Dadas veinte formas de madera diferentes, el alumno las clasificará por tamaños.

A statement of conditions is not always an essential part of an instructional objective; for example:

-The child will write the letters of the alphabet.

Here it is obvious that the child will be given paper and pencil. Specifying these conditions along with room lighting and that the child will be sitting down are unnecessary. Remember, the purpose in writing objectives is to communicate instructional intent clearly. When adding conditions fails to clarify the objective, but instead adds unnecessary and obvious wording, omit the conditions. Here's another example:

-The child will recognize verbs by underlining them in a sentence.

Cuando las condiciones específicas están implícitas en el resultado del aprendizaje o su indicador, no es necesario mencionarlas al escribir el objetivo.

Here it's obvious that he will be given a work sheet with sentences containing nouns and verbs. However, if the written words are laminated in plastic and placed at the bottom of a fish tank, and the child has to wear a diver's mask, these conditions must be stated in the objective.

EXERCISE: Distinguish the conditions of an instructional objective from the learning outcome by drawing one line under conditions and two lines under the observable outcome.

1. Given a classroom picture, the child will name orally the objects in the room.
2. Given a job application form, the student will fill in the necessary information.
3. The child will order a meal in a restaurant.
4. Given a number of geometrical shapes, the child will discriminate the shapes by grouping like shapes together.
5. The student will add three-digit numbers on an adding machine.
6. Dado un retrato de un salón de clase, el alumno responderá a preguntas acerca de la posición de los objetos.

7. Usando las tarjetas relámpago de los números, el alumno seleccionará los números pares.

In examples 3 and 5, the learning conditions are understood and need not be stated. Here are the answers to this exercise:

1. Given a classroom picture, the child will name orally the objects in the room.
2. Given a job application form, the student will fill in the necessary information.
3. The child will order a meal in a restaurant.
4. Given a number of geometrical shapes, the child will discriminate the shapes by grouping like shapes together.
5. The student will add three-digit numbers on an adding machine.
6. Dado un retrato de un salón de clase, el alumno responderá a preguntas acerca de la posición de los objetos.
7. Usando las tarjetas relámpago de los números, el alumno seleccionará los números pares.

The fourth criteria for an instructional objective is that:

4. An instructional objective indicates how well the learning act is to be performed.

Consider the following instructional objectives.

-The student will compute in writing the sum of two-digit numbers.
-The student will compute in writing the sum of two-digit numbers, getting 90% correct.

Many writers of instructional objectives include the underlined portion, which is called a criterion level. This level indicates how well the student must perform to demonstrate mastery of the skill stated in the instructional objective. In this objective if the student does not get 90% of the two-digit addition problems correct, he will not have demonstrated satisfactory mastery of that objective.

Such criterion levels are useful when we want the student to master a series of objectives in a designated period of time, so you can proceed to another unit. However, there are times when the explicit statement of a criterion level is unnecessary. Consider the following example:

The child will correctly use past-tense grammatical forms.

To establish some cutoff point here would be arbitrary and useless. This is a developmental skill to which we hope the child progresses over a period of time. Students will arrive at this level at different times; we don't expect all to have the same level of proficiency at a certain date. Objectives which state criterion levels imply that we want all students to attain the same level of mastery. Developmental skills such as problem solving, speaking, storytelling, running and cooperating do not lend themselves to arbitrary cutoff points.

Mastery skills, however, such as addition, letter formation, recognizing sounds, sequencing events, do. However, be reasonable about criterion levels. When the level of acceptable performance is obvious, don't state it; for example:

The child will identify the ten basic colors.
The child will recognize the letters of the alphabet.

Here it is obvious that we want 100% mastery. So:

Rule 1. Don't state the obvious.
Rule 2. Don't state arbitrary cutoff points where developmental skills are involved.

Indique el nivel de ejecución que demuestra el dominio de la habilidad especificado en los objetivos instruccionales. En los casos en que el criterio es "todo o nada", como son las habilidades que dependen del desarrollo, no es necesario especificar el criterio.

Reglas de sentido común:

1. Cuando el nivel de ejecución aceptable es obvio, no se debe especificar.
2. No se deben establecer puntos críticos arbitrarios para las habilidades que dependen del desarrollo.

EXERCISE: Distinguish developmental skills from mastery skills. Mark M for mastery, D for developmental.

____1. identify colors
____2. copy letters
____3. persist longer at a task
____4. get along with peers
____5. solve word problems in math
____6. write correctly your name, birthdate, address and telephone number
____7. divide two-syllable words properly
____8. write a story about a past experience
____9. distinguir verbos de adjetivos
___10. amarrarse los zapatos
___11. corregir la puntuación en un párrafo
___12. usar el tiempo futuro en la plática

3, 4, 5, 8, 10, 12 are developmental.

UNIT I MASTERY TEST

1. OBJECTIVE: Given an instructional objective in need of repair, the student will rewrite the objective so that it is suitable for evaluation. 4/5=mastery.

ITEM: The following objectives are in need of repair. Rewrite them so that they are suitable instructional objectives.

A. Learning conditions: The students read a chapter dealing with Darwin's theory of evolution.

OBJECTIVE: The students will appreciate the significance of Darwin's theory of evolution.

_____

_____

_____

B. Learning conditions: The students are taking a course in instructional objectives.

OBJECTIVE: Given a list of objectives, the students should be able to evaluate each objective.

_____

_____

_____

C. Learning Conditions: The students are taking a course in instructional objectives.

OBJECTIVE: The student must develop a logical approach to analyzing instructional objectives.

_____

_____

_____

D. Learning Conditions: The students are having a vocabulary lesson.

OBJECTIVE: Given a multiple-choice test, the students will get 90% of the questions correct.

_____

_____

_____

E. Learning Conditions: The students will see a film on the use of the library.

OBJECTIVE: The students will demonstrate that they can use a library by explaining the history and development of the Dewey Decimal System.

_____

_____

_____

2. OBJECTIVE: Given a broad, general statement of instructional intent, the student will write an instructional objective that specifies that intent. 4/5=mastery.

ITEM: Listed below are 5 general statements of instructional intent. For each statement write an instructional objective that specifies that intent. Your objectives will be evaluated on the basis of how well they meet the criteria discussed in this guide. Statements describing conditions are optional. Include them if special conditions are judged necessary. Criterion levels are also optional.

A. The students will understand long division. _____

_____

_____

B. The students will be familiar with recent research findings on the effects of smoking marijuana. _____

_____

_____

C. The student will be able to follow a map. _____

_____

_____

D. The student will realize the difference between objectives and goals. _____

_____

_____

E. The student will know the rules for correct punctuation. _____

_____

_____

3. OBJECTIVE: The student can distinguish learning activities from learning outcomes. 8/10 mastery.

ITEM: Below is a list of learning activities and learning outcomes. Place an A next to activities and an O next to outcomes.

___ A. The students will review the notes taken during today's lecture.

___ B. The students will study the diagram of the structure of an atom.

___ C. The students will explain the function of the carburetor in a short essay.

___ D. The students will practice their multiplication tables.

E. The students will identify the parts of speech in any sentence.

F. The students will watch the film The Return of Big Foot.

G. The students will analyze in writing a piece of poetry.

H. The students will listen to the teacher's explanation of fractions.

I. The students will compute the area of a circle.

J. The students will separate fact from opinion in a political speech.

UNIT I MASTERY TEST: ANSWER GUIDE

1. OBJECTIVE: Given an instructional objective in need of repair, the student will rewrite the objective so that it is suitable for evaluation. 4/5=mastery.

ITEM: The following objectives are in need of repair. Rewrite them so that they are suitable instructional objectives.

A. Learning conditions: The students read a chapter dealing with Darwin's theory of evolution.

OBJECTIVE: The students will appreciate the significance of Darwin's theory of evolution.

Must write learning outcomes that behaviorally define "appreciate the significance of."

B. Learning conditions: The students are taking a course in instructional objectives.

OBJECTIVE: Given a list of objectives, the students should be able to evaluate each objective.

"Evaluate" is covert and must be specified in terms of an indicator.

C. Learning Conditions: The students are taking a course in instructional objectives.

OBJECTIVE: The student must develop a logical approach to analyzing instructional objectives.

"Develop a logical approach to analyzing" is covert and needs an indicator.

D. Learning Conditions: The students are having a vocabulary lesson.

OBJECTIVE: Given a multiple-choice test, the students will get 90% of the questions correct.

"Get 90%" is not a learning outcome; you must specify a learning outcome.

E. Learning Conditions: The students will see a film on the use of the library.

OBJECTIVE: The students will demonstrate that they can use a library by explaining the history and development of the Dewey Decimal System.

Objective has an inappropriate indicator; revise the indicator.

2. OBJECTIVE: Given a broad, general statement of instructional intent, the student will write an instructional objective that specifies that intent. 4/5=mastery.

ITEM: Listed below are 5 general statements of instructional intent. For each statement write an instructional objective that specifies that intent. Your objectives will be evaluated on the basis of how well they meet the criteria discussed in this guide. Statements describing conditions are optional. Include them if special conditions are judged necessary. Criterion levels are also optional.

A. The students will understand long division. Must behaviorally specify "will understand."

B. The students will be familiar with recent research findings on the effects of smoking marijuana. Must write a learning outcome for "will be familiar."

C. The student will be able to follow a map. Must specify the learning outcome which will indicate a student can follow a map.

D. The student will realize the difference between objectives and goals. Must specify learning outcome for "will realize the difference."

E. The student will know the rules for correct punctuation. Must specify a learning outcome for "will know the rules."

3. OBJECTIVE: The student can distinguish learning activities from learning outcomes. 8/10 mastery.

ITEM: Below is a list of learning activities and learning outcomes. Place an A next to activities and an O next to outcomes.

A A. The students will review the notes taken during today's lecture.

A B. The students will study the diagram of the structure of an atom.

O C. The students will explain the function of the carburetor in a short essay.

A D. The students will practice their multiplication tables.

O E. The students will identify the parts of speech in any sentence.

A F. The students will watch the film The Return of Big Foot.

O G. The students will analyze in writing a piece of poetry.

A H. The students will listen to the teacher's explanation of fractions.

O I. The students will compute the area of a circle.

O J. The students will separate fact from opinion in a political speech.

Unit II. Analyzing and Rewriting Instructional Objectives

The previous unit demonstrated how to clearly specify instructional goals. Since people have been writing objectives for curriculum for nearly two decades, it is unlikely that you will have to try to actually develop instructional objectives for your teaching. More than likely you'll be given a curriculum guide that details what to teach. However, it is unfortunate that many of the objectives contained in such guides fail to measure up to the criteria of a well-written instructional objective discussed already. Therefore, you may be forced to repair these objectives before beginning the business of instruction.

This unit presents an analytical method for diagnosing problems in objectives and for repairing them. You already know what a good objective should look like. What is necessary now is a problem-solving strategy to help translate your misgivings about certain objectives into remedial action. The main point to remember is that if it isn't clear to you from the way the objective is stated what to teach or what behavior to measure, then the objective itself isn't clear and you should doctor it up.

Si el objetivo no es suficientente claro, necesita mejorarse, especificando lo que se pretende enseñar y la conducta que se va a medir.

Step One

First off, when analyzing an objective, ask yourself, "What learning outcome is stated in the objective?"

EXERCISE: Underline the specific learning outcome, if any, that is described in the following objectives.

1. The child will identify pictures of words that sound alike.
2. The child will demonstrate an appreciation for poetry.
3. The child will subtract one-digit numbers.
4. The child will show a knowledge of punctuation.
5. El alumno cantará de memoria "El Chorrito."
6. El alumno aprenderá las tablas de multiplicar.

While objectives 1, 3 and 5 should pass your initial inspection, 2, 4 and 6 fail right off. None of these objectives specify learning outcomes. In such cases, either cast the objective aside or perform some major surgery to get it in shape; in other words, rewrite it so that it specifies a learning outcome.

Step Two

Decide whether the learning outcome is the main intent of the objective or an indicator that implies the main intent.

You only reach Step 2 if you have a performance or observable learning outcome in the objective. Then you still must ask yourself, "What is the main intent of this objective?"; or better, "What did the person who wrote this objective want the student to acquire?"

Example: Having heard a story read out loud, the child will describe the main characters.

The main intent of this objective is no mystery. We want the student to be able to describe, either orally or in writing, the main characters of a story she has read. We might classify this as a comprehension level objective (about which there will be more in the next unit). However, consider the following:

Example: Given sentences with nouns, verbs and adjectives, the child will draw circles around the adjectives and boxes around the verbs.

What is the observable learning outcome in the objective? "The child will draw circles and boxes" of course.

What is the main intent of this objective? Careful now! The main intent isn't to draw circles or boxes, unless this is an abstract art course. The main intent is to see if the student can distinguish nouns from verbs from adjectives. This is a comprehension level objective. Drawing circles then is an indicator of learning. We infer that if the student can draw circles around the adjectives and box in the verbs, he can discriminate among these parts of speech.

Many objectives with observable outcomes are phrased not in terms of main intents, but indicators. You must reorganize such.

En los casos en que los resultados específicos del aprendizaje están implícitos, podemos inferirlos a través de alguna conducta indicadora.

EXERCISE: Distinguish main intents from indicators. Check whether the learning outcome is a main intent or indicator.

Objectives for a second-grade language-arts class.	Main Intent	Indicator
1. Color the short vowels in words.	_____	_____
2. Recite 4 lines of poetry.	_____	_____
3. Mark the past-tense verbs.	_____	_____
4. Describe a classroom object.	_____	_____
5. Identificar y trazar las letras N-n.	_____	_____
6. Tachar la puntuación incorrecta.	_____	_____

You should have checked 1, 3 and 6 as indicators. Coloring (1) indicates the student can recognize short vowels, just as marking (3) indicates the student can distinguish past-tense verbs from, say, present-tense verbs, and crossing out (6) indicates discrimination between correct and incorrect punctuation. On the other hand, reciting, describing, identifying and tracing are learning outcomes that are main intentions.

Step Three

If the learning outcome is stated in terms of an indicator, decide if the main intent is clear. Rewrite the objective if the main intent is not clear. The issue here is that if the main content of an objective is unclear to you, it is unclear. You're the teacher. You have to teach the

skill and evaluate it, so make sure you know what to teach and measure. Sometimes you won't be sure if the learning outcome is a main intent or an indicator. In such cases either discard or clarify the objective.

EXERCISE: The following objectives contain indicators. Check if the main intent is clear. Rewrite the objective if it is not clear.

	Main Intent Clear	Main Intent Unclear
1. The child will tell where another child in the classroom is.	____	____
Rewrite:		
2. The child will draw various geometric shapes.	____	____
Rewrite:		
3. The child will draw pictures from the story "The Five Chickens."	____	____
Rewrite:		

4. El alumno caminará sobre una línea de cinco centímetros de ancho pintada en el suelo. _____ _____

   Rewrite:

5. El alumno derivará la incógnita de una ecuación de primer grado. _____ _____

   Rewrite:

Since the issue here is whether the objectives are clear to you, there are no right or wrong answersto this exercise. However, many teachers find the main intent of 2, 3 and 4 unclear.

Step Four

If the learning outcome is the main intent, decide if it is overt or covert. If the main intent is covert, an indicator must be added.

You already should be able to define and distinguish between overt and covert outcomes; if not, review this information in Unit I.

EXERCISE: Following are some examples of objectives. For each objective write the main intent, indicate if it is overt or covert, and write an indicator if it is covert.

1. The child will be able to pronounce the initial sounds t and d, when heard in a spoken word.

   Main intent=
   Overt/Covert?
   Indicator=

   (Since the main intent is to pronounce and since that is an observable behavior, the objective is a healthy one.)

2. The student will analyze a story read in class.

   Main intent=
   Overt/Covert?
   Indicator=

   (In this objective, analyzing is a covert main intent. So you must add an indicator which will prove to you that the student is analyzing. A student might indicate he is analyzing a story by writing down the plot, listing the antagonists and protagonists, outlining the events and so on.)

3. The student will distinguish between a declarative and an exclamatory sentence.

   Main intent=
   Overt/Covert?
   Indicator=

   (Distinguishing is covert and needs an observable indicator such as "by circling" or "by underlining.")

4. El niño identificará como los recursos individuales ayudan a otros, al participar en el juego "La pelota va de ronda."

   Intención Principal=
   Abierta/Cubierta=
   Indicador=

   (To identify individual resources is covert and needs an observable indication which might be a detailed description of the student's participation in the game -- for example, naming the profession that will be needed in case of a specific problem.)

Step Five

When reading an objective containing an indicator, make sure the indicator is the simplest, most direct way of demonstrating the learning outcome. Consider the following objective:

> The child will be able to recall the names of the characters in "The Three Little Pigs" by writing an essay about each one.

Since recall is a covert main intent, an indicator is included in the objective. However, the indicator used in this example is an atrocious one. There must be a simpler, more direct way of demonstrating recall of names than by writing an essay; for example, saying or writing the names would probably be better. Besides, the student may not be able to write an essay. In this case, she might have learned the objective but failed to prove it to your satisfaction because you called for an inappropriate performance. Try rewriting that objective with a more direct and simple indicator.

Rewrite:

Rules for Deciding If an Objective Is Suitable for Item Writing

1. Determine what the learning outcome is; if you can't tell, rewrite or discard the objective.
2. If the learning outcome is an overt main intent, you are ready to write a test item.
3. If the learning outcome is an indicator, decide if the main intent is clear. If it is, you are ready to write a test item. If not, you must clarify the objective.
4. If the learning outcome is covert, you must add an indicator that is the simplest and most direct way of demonstrating learning. Now you are ready to write a test item.
5. Always test indicators against main intents. If they are inappropriate, revise them before writing the test item.

Reglas para decidir si un objetivo es aceptable para preparar las preguntas para una prueba.

1. Determine cual es el resultado del aprendizaje, si no está claro, vuelva a escribir el objetivo o descártelo.
2. Si el resultado del aprendizaje es abierto, proceda a escribir las preguntas que cubran este objetivo.
3. Si el resultado del aprendizaje es un indicador, determine si la intención principal está clara; si no, se debe clarificar el objetivo.
4. Si el resultado del aprendizaje es cubierto, se le debe agregar una conducta indicadora. Esta debe de ser la conducta más simple y directa que demuestra el aprendizaje.
5. Cheque la conducta indicadora con la intención principal. Si el indicador es inapropiado, vuélvalos a escribir antes de preparar las preguntas para la prueba.

EXERCISE: Decide whether or not each of the following objectives is ready for test-item writing. If not, rewrite it into a suitable form.

	Suitable	Not Suitable
1. The child will solve subtraction problems by describing the steps he goes through to get the correct answer.	_____	_____
Rewrite:		
2. The child will identify in writing the main characters of a story he has heard.	_____	_____
Rewrite:		
3. The child will develop the concept of the color red.	_____	_____
Rewrite:		

4. The child will choose pictures that show students behaving appropriately in class. _____ _____

   Rewrite:

5. The child will distinguish between a declartive and interrogative sentence by adding the appropriate punctuation. _____ _____

   Rewrite:

6. El niño ampliará el concepto de sonidos fuertes y suaves de animales, enumerándolos y clasificándolos correctamente. (SCDC) _____ _____

   Rewrite:

7. El niño podrá identificar los papeles que hacen el director y la enfermera, hacer el papel de estas dos personas y usar las formas ayuda y cura. (SCDC) _____ _____

Rewrite:

8. El niño podrá reconocerá las formas de dos dimensiones en dibujos de animales y personas (SCDC) _____ _____

Rewrite:

9. El niño podrá entrevistar a un adulto sobre los recursos del salón de clase que este recuerde haber tenido en la escuela. (SCDC) _____ _____

Rewrite:

Of these examples, objective 1 needs a better indicator. Objective 2 is OK. Objective 3, however, doesn't specify a learning outcome, and in 4 the main intent may not be clear. Objective 5 is OK, but 6 mixes learning activities with learning outcomes and does not specify how the student will demonstrate achievement. Objective 7 combines several objectives and needs to be broken down; also the indicator is not the simplest and most direct (a description or list of activities would be simpler than "play the role"). Furthermore it does not specify how the student is to use the form *ayuda* and *cura*. Objective 8 does not specify how the student will demonstrate that he recognizes the two-dimensional forms. It also fails to explain what the student is to compare animals and people to since these are all two-dimensional. Objective 9 has a very subjective criteria; when will the teacher consider that the student has conducted a "good" interview?

Unit III. Preparing a Content Outline

The previous units have shown you how to go about writing and evaluating instructional objectives. However, before writing the test questions which will make up your domain-referenced test, you must prepare a content outline. This outline can be thought of in terms of a test blueprint that describes the objectives you will cover in the test, the emphasis to be placed on each objective and the complexity of the objectives. Let us begin with the issue of complexity first.

Complexity of the Objectives

By way of demonstration, let us begin with a short exercise.

EXERCISE: Underline the learning outcome in the following objectives.

The student will write the names of 30 presidents of the U.S.
The student will identify the letters of the alphabet.
The student will count to 100 by 5s.
The student will recite 5 lines of poetry.
The student will match important events with the correct month and year.

All the above outcomes--write names, identify letters, count, recite and match--do not involve any complex thought processes. They are all at the rote, knowledge, factual level of learning. You may have realized this. In fact you may have heard the often stated objection about instructional objectives being trivial. Certainly they can be. Fortunately schemes have been developed for classifying objectives which allow us to recognize triviality. Such a scheme is Bloom's Taxonomy of the Cognitive Domain. This taxonomy allows us to classify objectives into six cognitive levels according to the complexity of the cognitive process necessary to master each objective. It is a valuable and essential tool in writing objectives. It is a way of guaranteeing that instruction isn't geared strictly to the trivial, most easily obtainable objectives.

Often children who perform well in domain-referenced tests developed by teachers fail miserably on standardized tests. A frequently heard explanation for this fact is that standardized tests are invalid while classroom tests are a more valid measuring instrument. Another explanation often extended is that while standardized tests are measuring higher level cognitive outcomes, classroom tests are geared strictly to the lowest level of learning. This unit is designed to guide you in carefully preventing your test from falling in the latter category.

Antes de comenzar a escribir preguntas para una prueba, se debe hacer un plan detallado de su contenido. Este plan debe cubrir los objetivos que se quieran medir con la prueba, el énfasis que se le da a cada objetivo, y su nivel de complejidad.

Levels of Cognitive Learning Outcomes

The levels of cognitive learning outcomes classified in the Cognitive Domain are:

Highest Level

Evaluation
(evaluación)

Synthesis
(síntesis)

Analysis
(análisis)

Application
(aplicación)

Comprehension
(comprensión)

Lowest level Knowledge
(conocimiento)

Bloom describes this taxonomy as a hierarchy, in which each step is a prerequisite and, consequently, at a lower level of complexity than the succeeding one. While this seems to be true for knowledge, comprehension and application, the other levels may not be in hierarchical form. Who is to say whether evaluation is a more complex mental process than synthesis or analysis? Research hasn't validated this hierarchy. So for our purposes, it is enough to accept there are higher and lower levels. Whether or not they conform to the perfect hierarchy as envisioned by Bloom is secondary to the more pressing need that students learn a variety of cognitive skills in school. Following is a short discussion of each level.

Knowledge

Objectives at this level require the student to remember. Test items ask the student to recall or recognize facts, terminology, problem-solving strategies, rules. Some action verbs that describe learning outcomes at the knowledge level are:

define (definir)	list (enumerar)	recall (recordar)
describe (describir)	match (aparear)	recite (recitar)
identify (identificar)	name (nombrar)	select (seleccionar)
label (clasificar)	outline (bosquejar)	state (enunciar)

Example: Prior learning conditions: The student has just seen a film Hemo, the Magnificent.

Objective: The student will be able to list the names of three blood cells.

(We include the specification of prior learning conditions because it is difficult to discern at what cognitive level an objective is, unless we know under what conditions it was taught. For example, we may fool ourselves into thinking a student is applying problem-solving rules if on the test he is given the same examples discussed in class.)

EXERCISE: Write an instructional objective at the knowledge level for the following.

1. Prior learning conditions: The teacher has just described the various occupations of people in the neighborhood.

   Objective:

2. Condiciones previas de aprendizaje: El alumno acaba de escuchar la selección musical Canción de Cuna de Brahms y seguir la melodía con el movimiento ascendente o descendente de su mano.

   Objetivo:

Comprehension

Objectives at this level require a rudimentary level of understanding. Test items ask the student to change the form of a communication (translate), to paraphrase what he has read, to see relationships among parts of a communication (interpret), to draw conclusions or consequences from information (infer). Some action verbs that describe learning outcomes at the comprehension level are:

convert (convertir)	estimate (estimar)	give examples - summarize (ejemplificar - resumir)
defend (defender)	explain (explicar)	infer (inferir)

distinguish (distinguir)	extend (extender)	paraphrase (parafrasear)
discriminate (discriminar)	generalize (generalizar)	predict (predecir)

Example: Prior learning conditions: The student has read a story in his reader.

Objectives: The student will summarize the main events of the story in his own words.
The student will defend the actions of the main character in a short story.
The student will write a title which best describes the story.

EXERCISE: Write an instructional objective at the comprehension level for the following.

1. Prior learning conditions: The student has just seen a film about the life of a dolphin.

   Objective:

2. Condiciones previas de aprendizaje: La clase acaba de terminar una lección de las diferencias entre el reportaje subjetivo y objetivo de noticias.

   Objetivo:

Application

Objectives written at this level require the student to use previously acquired information to solve a novel problem. The key word is novel. Application differs from comprehension in that application questions present the problem in a different (novel) context. Thus, neither the question nor the context helps the student decide what prior learned information he must use to solve the problem. Some action verbs that describe learning outcomes at the application level are:

change (cambiar)	employ (aplicar)	prepare (preparar)	use (usar)
compute (computar)	modify (modificar)	produce (producir)	transfer (transferir)
demonstrate (demostrar)	operate (operar)	relate (relacionar)	
develop (desarrollar)	organize (organizar)	solve (resolver)	

Example: Prior learning conditions: In language arts, the student has just learned when and how to form the past tense.

Objective: The student will tell the class what he did over the weekend.

Ejemplo: Condiciones previas de aprendizaje: En la clase de matemáticas, el alumno acaba de aprender cómo dividir fracciones.

Objetivo: Dadas fracciones que no se han cubierto en la clase, el alumno las dividirá y anotará la respuesta correcta.

EXERCISE: Write an objective at the application level for the following.

1. Prior learning conditions: The student has just learned how to use a dictionary.

   Objective:

2. Condiciones previas de aprendizaje: El alumno acaba de aprender los sonidos de las vocales en español.

   Objetivo:

Analysis

Objectives written at this level require the students to identify logical errors in writings (e.g., point out a contradiction or an erroneous inference); differentiate between facts, opinions, assumptions, hypotheses, conclusions. Questions for this level require analysis skills on material that is new to the student. Some action verbs that describe learning outcomes at the analysis level are:

break down (desglosar)	illustrate (ilustrar)	relate (relatar)
deduce (deducir)	infer (inferir)	separate (separar)
diagram (hacer un diagrama)	outline (delinear)	subdivide (subdividir)
differentiate (diferenciar)	distinguish (distinguir)	point out (hacer hincapié)

Example: Prior learning conditions: The student has had a lesson on the difference between arguments that attack the person versus arguments that attack the person's logic.

Objective: Given a presidential campaign speech, the student will point out the arguments that attack the person rather than his program.

Ejemplo: Condiciones previas de aprendizaje: La clase de sexto grado terminó una lección acerca de cómo algunas ideas son contradictorias; por ejemplo, un hombre no puede estar al mismo tiempo vivo y muerto.

Objetivo: Dadas afirmaciones absurdas (e.g. Un hombre tuvo influenza dos veces. La primera vez lo mató. La segunda vez se curó con prontitud), el alumno deberá explicar qué está mal en la afirmación.

EXERCISE: Write an instructional objective at the analysis level for the following.

1. Prior learning conditions: The student has a lesson on fact versus opinion and sees a 15-minute film on pollution by the Sierra Club.

   Objective:

2. Condiciones previas de aprendizaje: El alumno acaba de tener una lección sobre el método científico y se le da la descripción de un experiemento.

   Objetivo:

Synthesis

Objectives written at the synthesis level require the student to produce something unique or original. Questions at the synthesis level require students to solve some unfamiliar problem in a unique way, or combine parts to form a unique or novel whole. Some action verbs that describe learning outcomes at the synthesis level are:

categorize (categorizar)	rewrite (reescribir)
compile (compilar)	summarize (resumir)
compose (componer)	devise (idear)
create (crear)	formulate (formular)
design (diseñar)	predict (predecir)

Example: Prior learning conditions: The fifth-grade class has had a lesson on predicting outcomes in mystery stories.

Objective: Given a story, the student will write a different ending which is still a plausible one.

Prior learning conditions: One high school class has just had a lesson on how to design a scientific experiment.

Objective: Given a problem to be solved, the student will design a scientific experiment to solve the problem.

EXERCISE: Write an instructional objective at the synthesis level for the following.

1. Prior learning condition: The student goes on a field trip to a hydroelectric power plant.

   Objective:

2. Condiciones previas de aprendizaje: El alumno acaba de eschuchar un plática acerca de algunas de las ocupaciones relacionadas con la salud que existían en la época de la colonización y de los conflictos relacionadas con estas ocupaciones.

   Objetivo:

Evaluation

Instructional objectives written at this level require the student to form judgments about the value or worth of methods, ideas, people or products that have a specific purpose. Questions require the student to state the basis for her judgments, i.e., what external criteria or principles did she draw upon to reach her conclusion. Some action verbs that describe learning outcomes at the evaluation level are:

appraise (evaluar)	criticize (criticar)	justify (justificar)
compare and contrast (comparar)	defend (defender)	support (soportar)
conclude (concluir)	interpret (interpretar)	validate (validar)

Example: Prior learning conditions: The class has had a lesson on how to write a paragraph.

Objective: Given a previously unread paragraph, the student will judge its value according to the six criteria discussed in class.

Condiciones previas de aprendizaje: El alumno acaba de tener una lección sobre los valores del capitalismo y socialismo.

Objetivo: El alumno describirá un sistema económico.

EXERCISE: Write an instructional objective at the evaluation level for the following.

1. Prior learning conditions: The student has been studying various proposals for dealing with the energy crisis.

   Objective:

2. Condiciones previas de aprendizaje: El alumno acaba de tener una lección sobre la fisiología del sistema nervioso central.

   Objetivo:

Developing a Blueprint

This section presents a series of steps which will facilitate the development of a blueprint for a domain-referenced test.

STEP I

Identify the unit of instruction about which you want to test. Examples might be:

Phonetic Skills	Addition Skills
Parts of Speech	Subtraction Skills
Uso de verbos en el pasado	Conocimiento de ocupaciones
Transformación de tiempos	Variedades de plantas y animales

The unit you identify now represents the domain which subsumes the objectives that you will teach and test subsequently.

STEP II

Specify the concepts, skills, ideas or information in that segment. Examples of this might be:

Phonetic Skills	Parts of Speech
-initial consonants	-nouns
-final consonants	-verbs
-initial blends	-adjectives
-combinaciones finales	-adverbios
-vocales largas y cortas	

Los pasos a seguir para desarrollar un programa detallado o anteproyeto de una prueba basada en el área de instrucción son los siguientes:

1. Identificar la unidad de instrucción sobre la cual se va a examinar. Esta unidad es el área que cubre los objetivos que se enseñarán y examinarán.
2. Especificar los conceptos, habilidades, ideas o información en esa unidad.
3. Expresar los conceptos, habilidades, ideas o información en forma de objetivos instruccionales, indicando su nivel taxonómico.
4. Asegurar que todos los objetivos importantes estén incluidos en el área de instrucción.

Now identify a unit of time of instruction over which you would want to test (one week, one month, six months), again specifying the concepts, skills, ideas or information in that unit.

STEP III

Restate the concepts, skills, ideas or information in the form of instructional objectives. Indicate taxonomy level. An example of this might be:

Unit on Phonetic Skills

Objective	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
1. Given orally a set of words containing initial and final consonants, the student will write the letter of the appropriate consonant.			X			
2. Given orally a set of words containing initial and final consonant blends, the student will write the letters of the appropriate blend.			X			
3. Dadas palabras impresas que contien vocales largas y cortas, el alumno identificará aquellas que tienen sólo vocales cortas.			X			

These three objectives now make up the content domain of your test. Whatever test questions you write must refer to these three objectives. Your test will be called domain-referenced since every question is derived from and has direct reference to the particular domain of skills that you have taught for a unit of time.

It is probably wisest not to have large units or domains to test over. You want to know as soon as possible how well your students are learning your objectives. This will help you make any necessary changes in your teaching if the students are not learning and enable you to better individualize your instruction. The larger the unit you want to test, the less likely it is that student needs will be discovered and met.

STEP IV

Check to see that all important objectives are included in your domain. Check to see that the cognitive levels represented are those you desire. Decide how many items you want to have in your test to cover each objective. This is called "weighting your objectives." Decide how many of these items a student must answer correctly in order to master that objective.

The following blueprint is a useful device for planning your test. The example given in Step III has been entered with values given for "weighting" the test. Pay particular attention to the totals. They indicate how many objectives and test items are at various cognitive levels, providing a means of determining the cognitive complexity of the test.

The number of items written for each objective and the criterion level are left to the discretion of the test developer. Considerations of time, space and representativeness of test items are involved. These issues are further discussed in the last unit of this guide.

EXERCISE: Use the blank blueprint form to plan a test following the procedures outlined in Steps I-IV.

TEST BLUEPRINT FOR UNIT OF INSTRUCTION ON PHONETIC SKILLS

Domain of Skills	Taxonomy						Item Total	Criterion Level
	K	C	Ap	An	Sy	E		
Given orally a set of words containing initial and final consonants, the student will write the letter of the appropriate consonant.	X						20	80%
Given orally a set of words containing initial and final consonant blends, the student will write the letters of the appropriate blend.	X						20	60%
Dadas palabras impresas que contienen vocales largas y cortas, el alumno identificará aquellas que tienen sólo vocales cortas.	X						10	90%
TOTAL	3						50	

78

79

TEST BLUEPRINT FOR UNIT OF INSTRUCTION ON PHONETIC SKILLS

Domain of Skills	Taxonomy						Item Total	Criterion Level
	K	C	Ap	An	Sy	E		

80

81

Unit IV. Matching Test Items with Instructional Objectives

In this section we will begin writing test items that measure the skills in a given content domain. In other words, you are ready to develop a domain-referenced test.

The key to developing a test that is fair to students and fair to your teaching lies in writing test items (questions) that match your objectives. In fact, if your objectives are instructional ones that meet all the criteria, writing test items is a simple task. Test development becomes difficult only when the objectives on which the test is based are vague. Therefore, by spending some time and effort getting your objectives in shape you will be able to write test items without a great deal of trouble or grief. However, here again you must follow a certain procedure. The purpose and aim of this procedure is to ensure that the following condition is met: The learning outcome and conditions specified in the test item must match the learning outcome and conditions described in the objective.

Example 1: Objective: Given a written declarative sentence which includes the modal can, the student will write an interrogative sentence.

Item: Change the following statement to a question: Ramón can go.

_____

The learning outcome called for by the objective is "write an interrogative sentence." The test item instructs the student to do the same. The condition specified in the test item is "Given a written declarative sentence which includes the modal can." The test item provides this condition. Thus, we have a match. The test item is suited perfectly for the instructional objective.

Example 2: Objective: Given four choices, the student will recognize the rights which are guaranteed to citizens in the constitution.

Item: List six rights guaranteed to citizens in the constitution.

The learning outcome asks the student to recognize rights which are guaranteed by the constitution. The test item asks the student to list six rights. The item and objective do not match. Listing from memory involves recall while the objective calls for the student to recognize a guaranteed right from four choices, three of which are not guaranteed. Recognition is easier than recall and requires a different type of studying. In addition, the conditions of the objective and item do not match. The item did not include four choices as specified in the objective.

The first step, then, to writing test items that match objectives is to take care that the outcomes specified in items and objectives match. We can restate our rule or condition in the following manner:

DECIDE WHAT LEARNING OUTCOME IS CALLED FOR BY THE OBJECTIVE.

WRITE A TEST ITEM THAT ASKS THE STUDENT TO DO THE SAME.

EXERCISE: Write a test item for the following objectives:

1. Objective: The student will identify the verb in a sentence.

   Item:

2. Objective: The student will transform affirmative statements to negative statements.

   Item:

3. Objetivo: El alumno repetirá oralmente oraciones interrogativas.

   Pregunta:

EXERCISE: Circle whether the item outcomes and objective outcomes match:

1. Objective: The student will be able to define the grammatical term ownership.

   Item: The statement below shows ownership. Write a sentence that shows ownership in another way as shown in the example.

   Example: We have a pencil. The pencil is ours. You have a book. _____

   Match: Yes No

2. Objective: The student will choose the appropriate adjective to complete a sentence.

Item: Choose the adjective that completes the sentence and write it in the blank: Carlos enjoys a _____ movie.
a) hot c) difficult
b) green d) good

Match: Yes No

3. Objective: The student will analyze a political speech by listing all false assumptions and unsubstantiated conclusions.

Item: The following is a text of President Carter's recent speech. List all false assumptions and and unsubstantiated conclusions.

Match: Yes No

4. Objetivo: El alumno corregirá oraciones en las que el sujeto y el verbo no corresponden.

Pregunta: Explique las reglas para que correspondan el sujeto y el verbo.

Correspondencia: Sí No

5. Objetivo: El alumno aparejará preguntas con el objetivo apropiado.

Pregunta: Escriba una preguntas que examine el objetivo siguiente: El alumno calculará sumas de dos números.

Correspondencia: Sí No

In this exercise only two and three match. The major difficulty you have probably encountered at this point is determining that the skill called for by the item is the same as that called for by the objective. Often we want students to be able to merely recognize some fact, but we write test items calling for recall skills. Or an objective may call for the student to solve a problem while the item asks him to explain what he did to solve the problem. Asking a student to write a grammatically correct paragraph of 100 words is different from asking him to recognize grammatical errors in a paragraph of 100 words. In the same way, asking a student to compute the area of a rectangle is not the same as asking him to distinguish a rectangle from a parallelogram. The former is an application skill, while the latter involves comprehension.

The second step in writing valid test items is taking care that the conditions specified by the test item match the conditions described in the objective.

Often in constructing tests, teachers change the rules of the game on students. Teachers will teach a particular skill under one set of conditions while calling upon the student to demonstrate the skill in a different context. Some examples where testing conditions fail to match objectives and teaching conditions are:

Asking the student to add one-digit numbers without any aids when the objective specifies that the student must be given a number line.

Asking the student to write a test item for a well-written instructional objective when you give her a poorly written one.

Asking the student to identify similar sounding words in print, when the objective calls for the words to be read aloud.

Asking the student to solve simple multiplication problems from flash cards when the skill has always been taught with pencil and paper.

When conditions are changed on a test, a student very likely may fail the item although she has mastered the objective under the conditions originally specified. In such cases the student may have learned the objective being tested, but you won't be able to determine it from the test. And, if you can't tell if your objective has been learned, you cannot evaluate your instruction. So if your objectives are important and you want to know if they have been learned, take care that objective and test item conditions match.

EXERCISE: Write a test item for the following objective.

1. Objective: Given a map of North America, the student can locate the earliest European settlements.

   Item:

2. Objective: Given a poorly written instructional objective, the student can rewrite it in an appropriate form.

   Item:

3. Objective: Given a list of historical contributions of various ethnic groups, the student can identify the contributions of Mexican Americans.

   Item:

4. Objetivo: Dada una lista de oraciones en las que el sujeto y el verbo no corresponden, el alumno corregirá las oraciones.

   Pregunta:

EXERCISE: Circle whether item conditions and objective conditions match.

1. Objective: Given a written question using where and a set of responses, the student will select the most logical response.

   Item: Select the most appropriate response to the following question: Where did she go?

   a) She went to work this morning.
   b) She works for the phone company.
   c) She is at home.
   d) She is busy now.

   Match: Yes No

2. Objective: Given a well-written objective, the student will write an item to match the objective.

   Item: Write an item to match the following objective:

   The student knows the steps to solving subtraction problems involving borrowing.

   Match: Yes No

3. Objective: The student can introduce himself to one of his classmates.

   Item: Go up to a student that you don't know in the other second grade and introduce yourself.

   Match: Yes No

4. Objetivo: Dada una historia escrita en inglés, el alumno enumerará los eventos principales en orden.

Pregunta: Los siguientes eventos sucedieron en la historia que acabas de leer. Escríbelos en el orden apropiado.

Correspondencia: Sí No

5. Objetivo: El alumno podrá deletrear correctamente palabras que contienen juxtaposición de "i" y "e".

Pregunta: ¿Cuál es la regla de ortografía para deletrear palabras con "i" y "y" juntas.

Correspondencia: Sí No

In the exercise above examples 2, 3 and 5 do not match.

You should now be able to write test items that match your objectives. Often you will have to evaluate existing tests to determine if they are valid for your needs. Obviously a prerequisite for this is knowing the objectives on which the test items were based. If no such objectives exist, you will have to examine the test items in light of your own objectives.

Before we continue, let us summarize the procedure for matching test items and objectives:

STEP ONE: What outcomes are called for in the item and objective? Do they match? If so, check conditions. If not, either discard the item or rewrite it to match the learning outcome called for in the objective.

STEP TWO: What conditions are called for in the item and objective? Do they match? If so (and if outcomes match), you have an appropriate test item for measuring your objective. If not, either discard the item or rewrite it to conform to the conditions of your objective.

Para que un prueba sea justa al examinar el aprendizaje y la enseñanza, las preguntas deben corresponder con los objetivos. Los pasos para asegurarse de esto son:

1. Los resultados del aprendizaje especificados en las preguntas deben corresponder con los resultados del aprendizaje descritos en los objetivos. Los objetivos y las preguntas deben referirse a las mismas habilidades.
2. Las condiciones especificadas en las preguntas de la prueba deben ser las mismas que las condiciones descritas en los objetivos.

Estos pasos son válidos no sólo para construir pruebas, sino para evaluar pruebas ya existentes.

It is now time for some practice in discriminating between appropriate and inappropriate test items.

EXERCISE: Circle whether the following objectives and items match.

1. Objective: Given a written question using when, the student can choose the most logical response.

   Item: Write a logical response to the question: When does the bank open?

   Match: Yes No

2. Objective: Given a geographic term and a set of definitions, the student will select the correct definition.

   Item: A desert is:

   a) The producer of much of the world's food
   b) An area of little rainfall and sparse vegetation
   c) A large landmass surrounded by water
   d) Something sweet eaten after a meal

   Match: Yes No

3. Objective: The student can recognize the correct antonyms for a given word.

Item: Next to each word, write its opposite:

Black _____
Up _____
Stop _____
Beautiful _____

Match: Yes No

4. Objetivo: Dadas varias consonantes y vocales mezcladas, el alumno identificará las vocales.

Pregunta: Encierra en un círculo las vocales que encuentres en el siguiente grupo de letras: A T O C I M D

Correspondencia: Sí No

5. Objetivo: Dada una línea recta de cuatro pulgadas de ancho, el alumno caminará 20 pasos sin caerse.

Pregunta: Camina 20 pasos en la barra de equilibrio que está en el suelo del patio de recreo.

Correspondencia: Sí No

In the preceding exercise the objectives and items in examples 1, 3 and 5 do not match.

The following exercise provides practice in revising items that do not match objectives. Up until now, you have examined appropriate as well as inappropriate items. Now let's try to correct some inappropriate items.

EXERCISE: Following are some objectives with items that, presumably, measure that objective. Revise the objective, item or both so that the item and objective match.

1. Objective: The student will be able to describe the duties performed by a car mechanic.

   Item: Which of the following jobs typically are performed by auto mechanics? Place a check next to the appropriate job:

   ____Bakes cakes
   ____Changes brake pads
   ____Does tune-ups
   ____Builds chairs
   ____Repairs pipes
   ____Repairs damaged fenders

   Revision:

2. Objective: Given a straight line 4 inches thick, the student will walk 20 steps without falling.

   Item: Walk 20 steps on the balance beam lying on the floor.

   Revision:

3. Objective: The student can list five criteria for a good essay.

Item: Read the following essay by Lamb and decide how well it meets the five criteria for a good essay described in class.

Revision:

4. Objetivo: El alumno distinguirá el razonamiento inductivo del razonamiento deductivo, dando ejemplos de los dos.

Pregunta: Escribe una discusión contra el aborto, usando razonamiento deductivo y razonamiento inductivo.

Revisión:

Unit V. Constructing Different Item Types

At this point you now have all the basic skills required to assemble a domain-referenced test which measures only those objectives with which you are concerned. You can 1) write instructional objectives, 2) repair poorly written ones, 3) develop a content outline, 4) match item outcome and conditions with objective outcome and conditions and 5) fix poorly written items so that they match objectives.

This unit is designed to extend the item-writing skills developed in Unit IV. It discusses the mechanics of writing various types of items, such as short-answer, completion, true-false, multiple-choice, matching and essay. Once your objective is written, you can choose as many of these item formats as you desire. There are many rules for writing such formats. However, regardless of what item format you choose, the rule learned in the previous unit holds unflinchingly; that is: The learning outcome and conditions specified in the test item must match the learning outcome and conditions described in the objective.

Los tipos de preguntas que se usan para medir los logros académicos son las preguntas de respuesta corta y las de ensayo, análisis o narración. En las pruebas basadas en un área de instrucción o pruebas de criterios, debe haber correspondencia entre los resultados del aprendizaje y las condiciones requeridas por las preguntas y por los objetivos instruccionales.

SHORT-ANSWER QUESTIONS

Here is an example of the item formats that might be chosen by a teacher after a unit on reading comprehension. Our teacher is Frank Main and the following were his objectives.

1. Given a story, the student can recognize the meaning of all new words.
2. The students can match the characteristics of leading characters with their names.
3. The student can write a plausible alternative ending to the story.
4. The student will be able to recognize whether or not certain events occurred.

Objective 1: There were ten new words in the story. Frank randomly chose eight of them. Since the objective calls for the student to recognize the meaning of the words, Frank chose a multiple-choice format.

Item: Circle the letter which represents the correct meaning of the following words.

1. intention
   a. (definition)
   b. "
   c. "
   d. "

2. crisis
   a. (definition)
   b. "
   c. "
   d. "

Etc.

Objective 2: There were six main characters. Frank used a matching format using five characters.

Item: Column A contains a list of the main characters in in The Adventures of Huckleberry Finn. Column B contains descriptions of these characters. In the space provided, write the letter of the descriptions that matches the name of the character. Column B descriptions are used only once.

Column A: Characters	Column B: Descriptions
____1. Tom	a. cruel and vicious
____2. Becky	b. always by himself/ herself, a loner
____3. Jim	c. popular, outgoing, fun-loving
____4. Huck	d. always criticizing
____5. Mrs. Watson	e. sneaky, liar, schemer
	f. kind, gentle, loyal

Objective 3: Frank chose an unstructured short-essay format to measure this objective.

Item: You have just read the story The Adventures of Huckleberry Finn. In 40 words, write a different but reasonable ending to the story (reasonable has been defined in class).

Objective 4: Frank chose to measure this objective with a true-false format.

Item: Below are a list of incidents. Circle True if this happened in the story The Adventures of Huckleberry Finn and False if it did not.

1. The thieves were killed in the storm on the river. True False
2. Jim gained his freedom. True False
3. Tom broke a leg. True False

Etc.

Si el maestro Frank estuviera escribiendo sus objetivos y pruebas en español, hubiera escrito lo siguiente:

Objetivo 1: Dada una historia, el alumno podrá reconocer el significado de todas las palabras nuevas.

Pregunta: Encierra en un círculo la letra que representa el significado de las siguientes palabras:

1. intención
   a. (definición)
   b. "
   c. "
   d. "
2. crisis
   a. (definición)
   b. "
   c. "
   d. "

Objetivo 2: El alumno podrá aparear las características de los personajes principales con sus nombres.

Pregunta: La columna A es una lista de los personajes principales del libro Las adventuras de Huckleberry Finn. La columna B contiene descripciones de estos personajes. Escribe en los espacios la letra de la descripción que corresponde al nombre del personaje.

Columna A: Personajes	Columna B: Descripciones
____1. Tom	a) cruel y malvado
____2. Becky	b) solitario
____3. Jim	c) popular, divertido
Etc.	Etc.

Objetivo 3: El alumno escribirá un final que sea alternativa razonable para la historia.

Pregunta: Acabas de leer la historia de Las aventuras de Huckleberry Finn. Con 40 palabras, escribe un final diferente, que sea razonable para esta historia (razonable ha sido definido en la clase).

Objetivo 4: El alumno podrá reconocer si ciertos hechos ocurrieron o no en la historia.

Pregunta: A continuación hay una lista de hechos. Encierra en un círculo la letra V si es verdad que este hecho sucedió en la historia. Encierra en un círculo la letra F si es falso.

1. Los ladrones murieron en la tormenta en el río.	F	V
2. Jim obtuvo su libertad.	F	V
3. Tom se rompió una pierna.	F	V

Etc.

As you can see, a variety of formats fits nicely with different objectives. However, there are a number of considerations involved in your choice of formats which we will discuss below.

There are two basic types of short-answer items:

1. Free-choice short-answer formats
2. Fixed-choice short-answer formats

Free-choice formats can have either unstructured or completion formats. The free-choice formats are suited best for measuring factual recall, the lowest level in the domain of cognitive skills. Other formats can accomplish this task just as well, although they may be more difficult to write. The characteristics of both free-choice formats (unstructured or completion) are outlined below.

1. UNSTRUCTURED TYPE:

Student answers a question with a word, phrase or number.

Examples:

Objective: The student will identify the Presidents of the U.S. in order.

Item: Who was the seventeenth president of the U.S.?

Objective: The student will be able to add three-digit numbers.

Item:
```
 464      595
+232     +163
```


Hay dos tipos de preguntas de respuesta corta:

A. Selección Libre
   1. No estructuradas: Requiere que el alumno conteste con una palabra, frase o número
   2. De completar: El alumno debe llenar el espacio que completa con una palabra o frase una oración.

Advantages:

Minimizes guessing
Easy to write and match to objectives

Disadvantages:

Scoring: may be more than one correct answer

Suggestions for writing:

Write item so that correct response requires the fewest words possible.
Keep the item short, to the point, written in simple language and in question form.
Ensure that there is only one correct response.

2. COMPLETION TYPE:

Students must fill in or complete a sentence in which a word or phrase is missing.

Example:

Objective: The student will recognize the characteristics of the eight parts of speech.

Item: A word that describes the name of a person, place or thing is called a _____.

Advantages:

Minimizes guessing
Easy to write, score and match to objectives

Disadvantange:

Often rules of grammar make writing items difficult.

Suggestions for writing:

The item should have a single correct answer, either a single word or phrase.
Avoid grammar giving clues to the answer.
Place blanks at end; avoid so many blanks that the item is ambiguous.

We now turn to the fixed-choice formats to survey, briefly, these item types. The basic difference between fixed-choice and free-choice formats is that the former provide the students with two or more alternative answers and request the student to select the correct one. The basic types of fixed-choice formats are:

True-False
Matching
Multiple-choice

The characteristics of each of these item types are presented on the following pages.

B. Selección Fija
   1. Falso-verdadero: Ofrece dos opciones de respuesta.
   2. Apareamineto o correspondencia: Requiere que el alumno haga distinciones entre hechos o ideas similares.
   3. Opción multiple: Ofrece cuatro o cinco alternativas de repuesta. Es apropiado para examinar todos los niveles de aprendizaje.

1. TRUE-FALSE FORMAT:

Two response choices are provided; the choices can also be in the form Yes-No.

Example:

Objective: The student will recall facts about the major geographic features of the seven continents.

Item: Below are a list of statements about the seven continents. Circle True if the statements are correct, circle False if they are not.

Africa has large deserts along the East and West Coast. True False

Western North America is primarily flat plateau. True False

Etc.

Advantages:

Measures student's knowledge of a large body of facts in short time span
Easy to write, score and answer

Disadvantages:

Easy to guess and get correct
Tend to be ambiguous and confusing if not written correctly

Suggestions for writing:

Write all true items, then turn half to false. This assures uniformity of structure and form.

Avoid not or other negatives when turning items around as this leads to ambiguity. For example, "Most Australians live on the East Coast" (True) can be changed to "Most Australians live on the West Coast" False), instead of "Most Australians do not live on the East Coast." Avoid use of terms like always, never, sometimes, generally; these either give or lead to ambiguity. Include only a single major point in each item; don't use double-barrelled questioning.

2. MATCHING FORMAT:

This format is suitable for determining if the student can distinguish between similar ideas or facts.

Example:

Objective: The student can associate major figures of the Civil War with an event for which they are famous.

Item: Column A contains facts about major Civil War people. Column B contains their names. In the space next to the facts in Column A, place the appropriate name from Column B. Column B answers are used only once.

Column A		Column B
___1.	defeated at Gettysburg	A. Burnside
___2.	shot by his own men	B. A. Johnston
___3.	destroyed farms on his march through Georgia	C. Grant D. Stuart E. Sherman
___4.	defeated at Shiloh	F. McClellan
___5.	defeated at Fredericksburg	G. Lee H. Jackson
___6.	great cavalry leader	

Advantages:

Can test many facts with single item
Requires discrimination skills

Disadvantages:

Difficult to write well
Not suited for heterogeneous, factual knowledge bases
Often provides clues to correct answer

Suggestions for writing:

Make all choices homogeneous.
Keep responses short, keep list short (no more than 10).
Have plausible alternatives that will not be used for matching.
Arrange choices in a logical order, if one exists.

3. MULTIPLE-CHOICE FORMAT:

At least four (no more than five) alternatives are included to choose from. This format is suitable for measuring all levels of learning in the cognitive domain.

Example:

Objective: The student can select the best title for a paragraph he/she has read.

Prior Learning Condition: The student has read a paragraph about an animal.

Item: Choose the best title for this paragraph:

(a) The Desert Cuckoo
(b) Man's Best Friend
(c) Snakes Beware
(d) Animals That Speak

Advantages:

Well-constructed items can measure higher level cognitive outcomes.
Can be scored quickly.

Disadvantages:

Very difficult to construct items that measure skills above the knowledge level
Success can be achieved by guessing.

Suggestions for writing:

There are dozens of suggestions for writing multiple-choice items. Some of the more salient are:

There must be one best answer or one answer only; make all alternatives plausible but incorrect, to minimize the effects of guessing.
Write questions and choices in clear, simple language.
Avoid use of never, always, all.
Avoid grammatical clues to the correct answer.
Make all alternatives of same length, complexity and grammatical form.
Make sure the stem of the item presents a problem.
Avoid use of negatives in the stem.
Minimize use of alternatives such as none of the above.

EXERCISE: Given the information on short-answer items outlined above, write short-answer items for the objectives that follow.

1. Write an unstructured type item for the following objective.

   Objective: The student can name the five vowels.

   Item:

2. Write two completion items for the following objective.

Objective: Given the title of any piece of American literature covered in class, the student can identify the author.

Item:

Item:

3. Write four True-False items for the following objective.

Objective: The student can distinguish between the functions of the legislative, judicial and executive branches of U.S. government.

Item:

Item:

Item:

Item:

4. Write a matching item with seven to ten responses for the following objective.

Objective: The student will associate major lakes in the United States with the states in which they are found.

Item:

5. Write two multiple-choice items for the following objective.

Objective: The student can recognize the definition of geographic terms used in the text.

Item:

Item:

EXERCISE: Revise all of the following questions according to the suggestions that have been presented in this section. (Answer key on pages 95-98).

A. Completion Format

1. The evolutionary theory of _____ is based on the principle that _____.

Rewrite:

2. A subatomic particle having a negative charge and a negligible mass is an _____ _____.

Rewrite:

3. Columbus discovered America in _____.

Rewrite:

4. La capital de Canadá es _____.

Rewrite:

B. True-False Format

1. All men are created equal.

Rewrite:

2. Humphrey received a large number of votes in the 1968 presidential election.

Rewrite:

3. The Magna Carta was signed in 1215 B.C.

Rewrite:

4. Maid Marion, Little John and Brother Tuck are all characters in Robin Hood.

Rewrite:

5. Los niños con IQ alto obtienen mejores calificaciones que los niños con IQ bajo.

Rewrite:

C. Matching Format

____1.	discovered penicillin	A.	Armstrong
____2.	discovered America	B.	Columbus
____3.	first astronaut to walk on the moon	C.	Fleming
		D.	Glenn
____4.	invented the cotton gin	E.	Jefferson
____5.	first explorer to sail around the world	F.	Magellan
		G.	Newton
____6.	first U.S. astronaut to orbit Earth	H.	Salk
		I.	Washington
		J.	Whitney

Rewrite:

D. Multiple-choice format

1. Which of the following men invented the telephone?

   A. Bell
   B. Salk
   C. Morse
   D. Pasteur
   E. Marconi

   Rewrite:

2. Test reliability

   A. may be improved by increasing the length of the test
   B. may be improved by including many difficult items
   C. may be improved by shortening the test
   D. may be improved by changing to a criterion-referenced test

   Rewrite:

3. Which of the following diseases is caused by virus?

A. gallstones
B. scarlet fever
C. typhus fever
D. typhoid fever
E. viral pneumonia

Rewrite:

4. *Rien* quiere decir

A. nada
B. algo
C. sonreír
D. de otro modo

Rewrite:

5. *Rien n'est parfait* quiere decir

A. todo lo que termina bien es bueno
B. nada es perfecto
C. es divertido leer
D. todo está perdido

Rewrite:

KEY TO REWRITING TEST ITEMS (pages 89-94)

A. Completion Format

1. Too many blanks and their placement make this item ambiguous. The question could be correctly answered: "The evolutionary theory of ___the Bible___ is based on the principle that God created the universe."

or

"The evolutionary theory of ___Darwin___ is based on the principle that natural selection results in the survival of the fittest."

This question could be answered in other ways and still be internally consistent and, consequently, correct. In rewriting this question, you should specify what evolutionary theory you are talking about and focus the question so that only one answer can be correct.

2. The use of the word an in the stem of this question is a grammatical clue that gives away the answer. It could not be an proton or an neutron. It must be an electron. Rewrite this question to eliminate this grammatical clue.

3. This question is ambiguous: "Columbus discovered America in a boat; in 1492." If you want a date as a correct answer ask, "Columbus discovered America in the year _____."

4. *Es* could refer to any qualifying adjetive as well as the name of the city, for example "*es muy fría*," "*es demócrata*," "*es una ciudad muy grande*," etc.

   Rewrite: La capital de Canadá es la ciudad de _____.

B. True-False Format

1. The statement "All men are created equal" is an expression of belief or philosophy, not a statement of fact. Therefore, it is not appropirate to ask whether it is true or false. Rewrite this item to reflect a factual situation such as "The Declaration of Independence contains the statement that all men are created equal" (True) or "The statement 'all men are created equal' is contained in the Preamble to the Constitution" (False).

2. This question is ambiguous since "a large number of votes" is a subjective judgment. What is "a large number of votes"? Ten? Ten thousand? Ten million? If a student answered this question "true," you would know that the student knew that Humphrey ran for President in 1968. In rewriting this question, be sure you are not asking for a judgment. As it is, the item might be seen as asking two questions: "How many votes did Humphrey get?" and "Did he run for President in 1968?" Your rewrite should not be "doubled barrelled."

3. This question is given away by using 1215 B.C. All a student has to know to get this right is that the Magna Carta was signed sometime after Christ's birth: A.D., not B.C. As it is now, the question is too obviously false to tell the teacher very much about what the pupil has learned. It is too easy to guess the right answer. Rewrite the question so it is less obviously false, e.g., "The Magna Carta was signed in 1512 A.D."

4. One of the cardinal rules in writing good true-false questions is to avoid using words like all, none, always, never. The word all in this question may be confusing. Does the question mean that these three characters are the only ones in Robin Hood? To the test-wise student, true-false questions with words like all are easy to guess correctly: they are usually false. This question could be rewritten by just removing the word all.

5. In this case, always is implicit. This makes it very likely that the question is false. To rewrite add "*en general*" or "*en la mayoría de los casos.*"

C. Matching Format

The problem with this question is that it is heterogeneous. It mixes questions about scientists (inventors) with questions about explorers. The response options are not equally plausible. They include explorers, scientists and political leaders. This item could be divided into at least two questions one about explorers and one about scientist-inventors. Of course, the response options need to be improved. Eliminate Washington and Jefferson: They are not plausible and are easily rejected as possible correct answers, thus increasing the student's chances of getting the question right by guessing. You should also add two more plausible explorers, one associated with space travel (e.g., Shepard) and one associated with fifteenth and sixteenth century exploration (e.g., Balboa or Vespucci).

D. Multiple-Choice Format

1. The response possibilities given with this question are not equally plausible. Bell, Morse and Marconi are good response options since they were all inventors in the field of electronics and communication. Salk and Pasteur are bad response options because their contributions are in the field of medicine and health. Including them as possible answers increases the chances of getting the question right by guessing since it is easy to eliminate them as possible correct answers. This means that the student has a 1 in 3 chance of getting the correct answer by guessing instead of a 1 in 5 chance. Rewrite this item by throwing out Pasteur and Salk as possible answers and adding other electronics and communications inventors such as Edison.

ESSAY QUESTIONS

While it is true that of the short-answer items, multiple-choice questions can measure analysis, synthesis and evaluation skills, creating such items is enormously time-consuming and demands the highest level of writing skill. There are a variety of texts which you should refer to for further discussion and development of the skills necessary for writing items of this type.

Teachers do, however, have an option in selecting item formats to measure higher level cognitive learning. The short-essay format can be successfully utilized if a few simple rules are followed. This section explains the criteria used for writing question formats that measure application, analysis, synthesis and evaluation. But first a word about the short-essay format--often referred to as a restricted-response essay.

What is a restricted-response essay format? In restricted-response essay questions the students are told specifically the context that their answer is to take. Thus, the form and scope of the students' answers are limited. A restricted-response essay question:

1. Limits the area covered by the question;
2. Uses words which themselves give directions, i.e., describes specific points to be covered, aims the student to the desired response;
3. Indicates length, point value and approximate length of time to be spent on the question.

An example of a poorly constructed essay question would be:

Item: Evaluate the open-classroom movement.

Preguntas de ensayo corto

Las preguntas de ensayo corto se usan para medir resultados de aprendizaje que incluyen expresión escrita, habilidad de analizar, sintetizar y evaluar nueva información aplicando un conocimiento previo. Cuando la pregunta de ensayo corto se usa para examinar la habilidad del alumno para aplicar lo aprendido, la pregunta debe presentar una situación concreta; debe requerir una acción o decisión para completar la tarea, y la acción o decisión debe estar basada en el conocimiento adquirido en el curso. Para medir la habilidad de análisis, el estudiante debe identificar los elementos básicos, sus relaciones y organización en un problema nuevo. La pregunta debe presentar una situación concreta, además de las instrucciones para responder; la situación debe contener principios y elementos que se puedan analizar; debe también pedir al alumno que describa las bases de su análisis.

Cuando la pregunta de respuesta limitada mide la habilidad para sintetizar, el alumno debe resolver un problema al aplicar conocimiento y, sobre todo producir nuevas ideas para lograr la solución.

An improved, restricted-response essay question would be:

Item: A recent article in Newsweek magazine described how in one California school district parents are registering their children in a very traditionally structured school, ignoring their other choice--a modern, lavishly equipped, open-space school. Newsweek feels that the educational fad of the sixties is on its way to an early demise. Compare and contrast the effectiveness of open-education classrooms and more traditionally structured ones along the following lines:

A. Children's Acquisition of Cognitive Skills
B. Affective Growth of Children
C. Involvement of Parents in the Classroom
D. Suitability for Culturally Different Groups

Spend about 30 minutes.

The Use of Restricted-Response Essay Items for Measuring Thinking Skills

Essay questions should be used to measure learning outcomes involving written expression, ability to apply knowledge and to analyze, synthesize and evaluate new information in light of what has been learned. Essays should not be used to measure whether students have learned facts or to measure comprehensive skills. Short-answer items do this best.

La pregunta debe incluir un problema nuevo, diferente a los que el alumno conoce; debe también pedir una solución original. Las preguntas de ensayo de respuesta limitada que miden evaluación, proveen al alumno con algo que debe ser evaluado, así como los criterios para evaluarlo.

Restricted-Response Essay Questions to Measure Application

In Unit III we discussed what application means. The key to measuring at the application level is to require the students to use already acquired information to deal with or solve a concrete problem or situation. There are three basic rules for writing application questions:

1. The item must present a concrete situation.
2. The question should require that some action take place or choice be made to accomplish the task.
3. The performance that takes place should be based on knowledge or skills that the student has learned in your class; however, the specific problem must be unfamiliar to the student.

Following are some examples of application objectives.

Objective: Given fractions not previously covered in class, the student will divide them and record the correct answer.

Item: Divide the following fractions; record your answer. Show all work. Credit given for correct method as well as correct answer.

1/2 ÷ 1/3 =
5/8 ÷ 1/4 =

Etc.

Objective: The student will be able to write a business letter that meets the standards discussed in class.

Item: You are interested in making glass and know of a company that does this. Write a letter to the company using proper form requesting a description of the glassmaking process. You will be graded on use of proper form, spelling, grammar and neatness. The letter should be approximately 75 to 100 words.

EXERCISE: Write an item to measure an application objective given in Unit III.

Prior learning conditions:

Objective:

Item:

Restricted-Response Essay Questions to Measure Analysis

The cognitive level of analysis requires that the student be able to identify basic elements, or relationships, or organizational principles of a specific task or problem for the first time. Some suggestions for writing analysis items are:

1. The item should include concrete situation, setting and response instructions.
2. The situation should contain elements, relationships or organizational principles that can be analyzed.
3. The student should be asked to describe the basis by which the analysis was accomplished.

Here is an example of an analysis objective:

Objective: Given a political speech, the student can identify assumptions, erroneous conclusions, faulty cause-effect relationships.

Item: Following is a text of Anita Bryant's speech on gay rights. Analyze this speech by pointing out all false assumptions, erroneous and unsubstantiated conclusions, faulty cause-effect relationahips. Describe how you arrived at your analysis, i.e., what led you to question certain statements as false, erroneous or unsubstantiated. Organization will be considered in grading this, as well as clarity of writing and thoroughness of analysis. Spend no more than 30 minutes. Question worth a total of 25 points.

EXERCISE: Write an item to measure an analysis objective given in Unit III.

Prior learning conditions:

Objective:

Item:

Restricted-Response Essay Questions to Measure Synthesis

Questions intended to measure synthesis present a problem to be solved. However, to solve this problem the student must go beyond applying knowledge already acquired and create new and, if possible, unique thoughts and productions. Here we mean new for the student, though not necessarily new in the sense that no one has discovered it yet. The problem must be novel and the solution original.

Here are some suggestions for writing effective restricted-response essay questions at the synthesis level:

1. The item should present a novel problem outside the range of the familiar or practical.
2. The item should request some novel solution from the student.

Here is an example of a synthesis objective:

Objective: The student will be able to write a plausible alternative ending to a short story. Plausible has been previously defined.

Item: You have just read Poe's short story "The Cask of Amontillado." Write a different but plausible ending to this story.

EXERCISE: Write an item to measure a synthesis objective given in Unit III.

Prior learning conditions:

Objective:

Item:

Restricted-Response Essay Questions to Measure Evaluation

An essay item intended to measure evaluation provides the student with something to be evaluated, a general criterion for evaluating it and general response instructions that urge the student to provide detailed support for her position or judgment.

Some rules helpful for writing essay questions that measure evaluation are:

1. The item should provide the student with something to be evaluated.
2. The item should provide directions that describe what aspect of the situation is to be evaluated.
3. Criteria for evaluation should be specified.

An example of an evaluation objective is:

Objective: Given a program for birth control, the student can write an evaluation of the program using criteria discussed in class.

Item: Indira Gandhi has been carrying out a mass sterilization program in India to reduce India's burgeoning population. Write an essay of 250-500 words evaluating this program. Specify the criteria by which you judge the value of this program. Support your conclusions with factual information whenever possible. Your essay will be graded on the basis of organization, explicitness of detail and extent of arguments supported by data. Spend about 2 hours writing this essay.

EXERCISE: Write an item to measure an evaluation objective given in Unit III.

Prior learning conditions:

Objective:

Item:

Scoring Restricted-Response Essay Questions

While essay questions measuring higher-level thinking skills require less preparation time than do multiple-choice items measuring analysis, synthesis, etc., they do require careful grading practices. The most fair and reliable method for grading an essay is the analytical method.

In grading an essay we allow the number of points designated for that item if the student's answer mentions what is contained in the model answer. The student gets no credit for mentioning things not included in the model answer.

This method of scoring is best suited for evaluating content. For synthesis objectives and for certain types of analysis and evaluation objectives, scoring strictly on content would defeat the purpose of giving a short essay in the first place. With analysis, synthesis and evaluation questions, we want to measure process as well as content.

La calificación de preguntas de ensayo se obtiene en forma diferente cuando se examina el contenido y cuando se examina el proceso que siguió el alumno. Cuando se examina el contenido, se escribe un ensayo modelo y se asignan determinados puntos para cada sección. Se califica el ensayo del alumno comparándolo con el modelo.

Cuando se está evaluando el procedimiento, no se puede usar un modelo. Se pueden construir escalas en lugar de modelo para calificar. Por ejemplo, la siguiente escala demuestra cómo se podrían asignar puntos para evaluar o calificar el proceso:

Measuring process is more difficult than measuring content since we can't write a model answer that anticipates the process the student will go through. In such cases we may use content analysis to assign points for content as we did above, while developing rating scales to measure process. For instance, in measuring process we could assign a spread of possible points such as is illustrated in the following example:

A. Solution:
   Accuracy 5 points
   Consistency 5 points
   Originality 5 points

B. Argument:
   Accuracy 5 points
   Consistency 5 points
   Originality 5 points

Such a rating scale would allow 30 possible points for process. The rules to keep in mind in using the analytical method for grading essays are:

1. A model answer should be written before the test is administered.
2. Point values should be assigned to the essential components of your model answer.
3. The student's answers should be examined to see if they include the essential points.
4. The student should receive the specified number of points for each component he deals with.

A. Solución
   Precisión 5 puntos
   Consistencia 5 puntos
   Originalidad 5 puntos
B. Argumento
   Precisión 5 puntos
   Consistencia 5 puntos
   Originalidad 5 puntos

Metodo Analítico para Calificar Ensayos

1. Escriba la respuesta modelo antes de aplicar el examen.
2. Asigne valores a los componentes esenciales de la respuesta modelo.
3. Examine la respuesta del alumno para ver si incluye los puntos esenciales.
4. Dé al alumno el número de puntos que vale cada componente.

Here is an example:

Objective: The student will be able to compare the life style of Neanderthal Man and Cro-Magnon Man.

Item: Compare the life styles of Neanderthal Man and Cro-Magnon Man. Discuss the special physical and mental abilities of each as well as tools, habitat, clothes, food and vocations. (14 points)

Grading criteria: Student must mention the following with 2 points allowed for each.

Special Abilities (2 points)
- Cro-Magnon - language
- Neanderthal - no language

Tools (2 points)
- Cro-Magnon - iron
- Neanderthal - wood

Habitat
- Cro-Magnon - caves
- Neanderthal - caves

EXERCISE: The following is an exercise in scoring essays. Note under which condition you feel most confidence in the score you assigned.

1. The answer to the following question was written by a student. It is worth 50 points. Grade this answer by assigning the points as you see fit. Record the number of points at the top of the page.

Question: Discuss the value of behavioral objectives.

Answer:

A highly readable book by Robert Mager written in 1962 sent the behavioral-objectives movement into high gear. Mager offered a tightly reasoned argument that instructional objectives could revolutionize classroom teaching and learning. They would do so by helping teachers specify what they wanted to teach, select the materials and procedures to reach their objectives and know whether the children learned the skills.

For Mager an instructional objective states what a learner will do at the end of an instructional sequence. The objective specifies the outcome in performance terms by making use of an action verb. Thus, the verb is the heart and soul of any instructional objective. Additionally, such objectives include a phrase describing the conditions under which the behavior will be observed and a minimal acceptable performance or criterion level. When skillfully written, this unique literary form resembles the following:

> Given a dictionary, the student will write the definitions of 20 new words without error.

Mager believes that teachers, armed with lists of such objectives, can more effectively develop curriculum, plan units or lessons, select instructional materials, choose appropriate teaching strategies and prepare and select tests relevant to the objectives of instruction. This last point is crucial for it underscores the key function of an instructional objective: evaluation.

Once a teacher states what children are to learn, the conditions of learning and a minimum acceptable level of performance, she can easily evaluate the effectiveness of her instruction. Objectives, then, become a principal means to accountability.

In the cost-conscious America of the sixties, instructional objectives became a focal point for those concerned about educational accountability. Federal bureaus and state departments of education required proposals for grants of money to have precise statements of behavioral outcomes. There was talk about holding individual teachers financially accountable for learning based on their classes' instructional objectives.

A backlash against objectives inevitably set in. Opponents criticized them as a threat to academic freedom and a denial of the individuality of children. Particularly, proponents of open classrooms charged that instructional objectives denied children choices, made no provisions for different rates of learning and ignored what the child brings to the learning environment.

The controversy still rages. All we can say today is that there is no clear evidence that objectives enhance classroom learning. However, students appear to like them. Courses in which objectives are given may reduce anxiety. Teaching should be more systematic although students may not learn information not specified by objectives. Thus, incidental learning may be reduced.

DO NOT TURN THIS PAGE UNTIL YOU HAVE GRADED THE ESSAY AND RECORDED THE SCORE.

142

2. Now grade the same answer if the question had been written the following way. Assign as many points as you see fit up to 50. Record the points at the top of this page.

Question: Discuss the value of instructional objectives in an essay of approximately 600 words. Discuss at least five separate issues related to the worth of objectives. Come to some conclusion about their usefulness in classrooms. Your essay will be evaluated on the basis of writing and organization, as well as the accuracy, consistency and originality of your argument. Your criteria for evaluation should be made clear, although they need not be elaborately described or defended. Your answer is worth a total of 50 points. Spend approximately one hour writing.

DO NOT TURN THIS PAGE UNTIL YOU HAVE GRADED THE ESSAY AND RECORDED THE SCORE.

3. Now, grade the same essay again as if the following score guide had been given to you. Assign up to 50 points as you see fit. Record the score at the top of this page.

Model Answer

I. Content

A. Essay must name and discuss five of the following points:

1. Effect of objectives on incidental learning
2. Effect of objectives on student's anxiety
3. Effect of objectives on student's individuality
4. Effect of objectives on student's self-concept
5. Effect of objectives on learning academic skills specified in the curriculum
6. Educational accountability

B. Student must cite published evidence related to the above points.

II. Process

A. Writing
1. Writing must be clear.
2. Argument must be well organized.

B. Argument
1. Must be original
2. Must be consistent
3. Must be accurate

DO NOT TURN THIS PAGE UNTIL YOU HAVE GRADED THE ESSAY AND RECORDED THE SCORE.

4. Now for the fourth and final time grade the essay if the scoring guide were improved in the following manner.

Model Answer

I. Content

A. The student must mention and discuss in a short essay five of the following issues:

1. Effect of objectives on incidental learning
2. Effect of objectives on student's anxiety
3. Effect of objectives on self-concept
4. Effect of objectives on academic-skill learning
5. Effect of objectives on student's individuality
6. Educational accountability

B. Assign 1 point for mentioning the issue
2 points for explaining the issue
3 points for citing published evidence relevant to the issue

C. Student can receive a maximum of 6 points for each issue and a total of 30 points maximum for the content score (6 X 5).

II. Process

A. Writing

1. Assign one to four points based on the following scale:

vague: 1 : 2 : 3 : 4 : clear
haphazard: 1 : 2 : 3 : 4 : organized

2. Assign a maximum of 8 points for writing.

B. Argument

1. Assign one to four points based on the following scales:

inconsistent	1	:	2	:	3	:	4	: consistent
inaccurate	1	:	2	:	3	:	4	: accurate
unoriginal	1	:	2	:	3	:	4	: original

2. Assign a maximum of 12 points for argument.

Writing score _____points
Argument score _____points
Process score _____points (writing + argument score)
Content score _____points

Total score _____points (process + content score)

5. Now record the points you assigned for each grading attempt and compare the outcome with your feeling of confidence in assigning the different scores.

First attempt _____points
Second attempt _____points
Third attempt _____points
Fourth attempt _____points Content _____
Process _____

2. Assign a maximum of 8 points for writing.

B. Argument

1. Assign one to four points based on the following scales:

inconsistent	1	:	2	:	3	:	4	: consistent
inaccurate	1	:	2	:	3	:	4	: accurate
unoriginal	1	:	2	:	3	:	4	: original

2. Assign a maximum of 12 points for argument.

Writing score _____points
Argument score _____points
Process score _____points (writing + argument score)
Content score _____points

Total Score _____points (process + content score)

5. Now record the points you assigned for each grading attempt and compare the outcome with your feeling of confidence in assigning the different scores.

First attempt _____points
Second attempt _____points
Third attempt _____points
Fourth attempt _____points

Content _____
Process _____

Unit VI. Relevant Questions

1. You say that the term domain in a domain-referenced test means a body of skills that make up a particular content area. Could you be clearer? How big is a domain?

   Well, a domain can be as large or small as you want it. The unit over which you want to test makes up your domain. If your tests are over a two-week unit in math skills--addition, for example--your domain would comprise all the math skills taught in that unit. Thus, there might be only a few skills that make up the domain at this point. On the other hand, if you give only one math test the entire year, your domain of skills will comprise all the skills learned in math over a nine-month period. In this case you will be writing a large number of instructional objectives that specify the skills in the domain.

2. How can I tell what the skills are in any particular domain?

   Curriculum guides usually detail these skills quite well. You may have to depend on your own experience, or that of others, or common sense. Ask yourself, "If a child must learn to speak English, what must he be able to do?" Write a sentence? Tie his shoes?

3. Once I list the skills in a domain I want to test over and write an instructional objective for each skill, how many test items do I make up to measure each skill?

El área de conocimientos o habilidades en que se basa un examen puede ser tan extensa o reducida como se quiera, dependiendo en la cantidad de información o entrenamiento que se imparta en el período de tiempo que cubre el examen.

Las guías de currículo, el sentido común y la experiencia le ayudarán a decidir qué habilidades forman parte de un área de conocimiento o habilidades.

Well, that depends. Take this example: "The student will ride a unicycle for 100 yards without falling." There is only one test item for this skill: "Here's a unicycle. Go ride it." So for some skills, one and only one item is necessary. But for cognitive skills this usually is not the case. Adding one-digit numbers that sum to 10 or less is a skill for which we could generate scores of items. Ask yourself, "How many one-digit or two-digit or three-digit numbers must a student add, subtract, multiply or divide before I am willing to certify that he has the skill? How many simple sentences must she write correctly, or words spell correctly before her credentials are proven?" Common sense, space and time limitations will influence your decision about numbers of questions.

El sentido común y limitaciones de espacio y tiempo le ayudarán a decidir cuántas preguntas son suficientes para examinar cada objetivo.

4. O.K. But given that I can generate a number of items to measure any one objective, how many should a student get right before I certify him in that skill?

Again that will depend. For certain skills you might want the child to master 100% of the items before you say a child has matered the objective. Certainly you would expect a dentist to fill cavities properly all the time. For adding, or defining, or discriminating, at the minimum we would want more than 60% success; most teachers would want 80-90%.

El tipo de habilidad de que trate un objetivo es el principal factor al determinar qué nivel de ejecución se require para considerar que el alumno domina el objetivo.

5. You have said that a domain-referenced test should be graded so that the grade or number says something about what the student knows and not where he stands in relation to others in the class. How do I do this?

What you are talking about here is criterion-referenced grading or evaluation. In other words, I set up a criterion for A, B, C in terms of how many objectives a student must master to get an A, B or C. Let's say that my reading test covers a domain of four skills:

1. Recognizing sight words from the Dolch List
2. Recognizing beginning and ending consonants
3. Recognizing blends
4. Writing the letters of the alphabet

For each skill I write an objective and generate items. For skill 1 I randomly choose 15 words from the Dolch List and set 80% as the level the student must reach in order to demonstrate mastery of that objective. In turn, I generate 20 items each for skill 2 and skill 3 at 90% and 10 randomly chosen letters for 4 at 100%. My record sheet looks like this:

La calificación de una prueba debe indicar, con letras o con número, qué proporción de los objetivos es dominada por el alumno.

NAME	OBJECTIVES 1 2 3 4	P=Pass objective F=Fail Grade
Juan	P P P P	A
María	F P P P	B
Sue	P P F F	C
Daniel	P F F F	D
Pablo	F F F F	F

A = 4 P's
B = 3 P's
C = 2 P's
D = 1 P
F = 0 P

Thus a grade of A tells me that Juan mastered all the objectives on my reading test. In other words he reached the specified criterion level for each objective in the domain. Sue, on the other hand, missed objectives 3 and 4 which tells me that she needs review here. Her grade of C indicates she has only mastered half the objectives in that particular domain.

There is no norm table, curve table or whatever to refer to when giving a criterion-referenced grade. You simply ask "How many objectives did the students master? What grade (value) do I place on that?"

Thus a grade of A tells me that Juan mastered all the objectives on my reading test. In other words he reached the specified criterion level for each objective in the domain. Sue, on the other hand, missed objectives 3 and 4 which tells me that she needs review here. Her grade of C indicates she has only mastered half the objectives in that particular domain.

There is no norm table, curve table or whatever to refer to when giving a criterion-referenced grade. You simple ask "How many objectives did the students master? What grade (value) do I place on that?"

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